Material Safety Data Sheet
May be used to comply with
OSHA's Hazard Communication Standard.
29 CFR 1910. 1200. Standard must be
consulted for specific requirements.

U. S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No.1218-0072

IDENTITY (As Used on Label and List)
CR2032

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacture's Name
TOSHIBA BATTERY CO.,LTD.

Emergency Telephone Number

Address (Number, Street, City, State, and ZIP Code)
4-10. MINAMI-SHINAGAWA 3-CHOME,
SHINAGAWA-KU, TOKYO 140-0004, JAPAN

Telephone Number for Information
TOKYO 03-5479-8237

Date Prepared
June.24,1999

Signature of Prepare (optional)
H. Takaguchi

Section II-Hazardous Ingredients / Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	%(optional)
Components firmly sealed within stainless-steel shell.				
1) Manganese Dioxide		30.3wt%		
2) Lithium Metal		1.9wt%		
3) Non aqueous Electrolyte		6.8wt%		
		Battery Weight 3.1g / Cell		

Section III- Physical / Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H_2O=1)	N/A
Vapor Pressure (mm Hg)	N/A	Melting Point	N/A
por Density (AIR=1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water
N/A

Appearance and Odor
* Coin - Shaped, Odorless.

Section IV- Fire and Explosion Hazard Data

Flash Point (Method Used)	N/A	Flammable Limits	LFL N/A	UFL N/A

Extinguishing Media
N/A

Special Fire Fighting Procedures
Use of self-contained Breathing Apparatus and proper personal protective equipment is recommended.

Unusual Fire and Explosion Hazards
When exposed to excessive heat cells may rupture and burn.

Section V - Reactivity Data

Stability			Conditions to Avoid
	Unstable		N/A
	Stable	X	

Incompatibility (Materials to Avoid)

Hazardous Decomposition or Byproducts

Hazardous Polymerization			Conditions to Avoid
	May Occur	N/A	N/A
	Will Not Occur	N/A	

Section VI - Health Hazard Data

Route(s) of Entry Inhalation? Skin? Ingestion?

Health Hazards (Acute and Chronic)

N/A

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

N/A

Signs and Symptoms of Exposure

N/A

Medical Conditions Generally Aggravated by Exposure

N/A

Emergency and First Aid Procedures

N/A

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

When accumulating large quantities of undercharged batteries for disposal, park in a non-conductive insulating material.

Waste Disposal Method

When discharged, the Wisconsin department of national resources has declared this type of Lithium cell Non-hazardous. Dispose of according to appropriate local, state and federal waste regulations.

Precautions to Be Taken in Handling and Storing

Don't store unpacked batteries together. This situation will result in cell shorting and heat build-up. Store under normal temperature and dry conditions.

Other Precautions

None under Normal use.

SectionVIII - Control Measures

Respiratory Protection (Specify Type)

N/A

Ventilation		
	Local Exhaust: N/A	Special: N/A
	Mechanical (General): N/A	Other: N/A

Protective Gloves	Eye Protection
None	N/A

Other Protective Clothing Equipment

N/A

Work/Hygienic Practices

N/A

*USGPO 1988-491-529/45775

SPECIFICATION FOR
COIN TYPE MANGANESE DIOXIDE LITHIUM BATTERY
Type : CR2032 (TOSHIBA Brand)

RECEIVED

1999

TOSHIBA BATTERY CO., LTD.
APPLICATION ENGINEERING
PRIMARY BATTERY GROUP

PRODUCT SPECIFICATION

1. Applicability: This specification is applicable to the following product:
Coin type manganese lithium battery CR2032

2. Battery type and ratings:
2.1 Battery type: CR2032
2.2 Nominal voltage: 3.0V
2.3 Standard capacity: 220 mAh (on continuous discharge at 20℃ under 15kΩ load to 2.5V end-voltage)
2.4 Outer dimensions: Outer dimensions shall be as shown in Fig. 1. Battery Dimensions.
2.5 Standard weight: 3.1 grams
2.6 Terminals: Materials of Positive electrode: Nickel-plated stainless steel
Negative electrode: Nickel-plated stainless steel

3. Quality requirements:
3.1 Dimensions: Dimensions of batteries when tested in accordance with Subparagraph 4.4(1) shall be as shown in Fig. 1, Battery dimensions.
3.2 Appearance: Battery shall have no deformation, dent, stain, leakage and camber or burr on their sealing members, which may adversely affect their appearance, performance and commercial value. There shall be no coatings or other foreign objects on the surfaces of terminals which may adversely affect actual use or performance of batteries.
3.3 Characteristics:
(1) Open-circuit voltage: Open-circuit voltage of batteries when tested in accordance with Subparagraph 4.4(3) shall meet the requirements set forth in Table 1.
(2) Closed-circuit voltage: Closed-circuit voltage of batteries when tested in accordance with Subparagraph 4.4(4) shall meet the requirements set forth in Table 1.

[Table 1]

Test items	Temperature	Initial*	After 12 months	Remarks
Open-circuit voltage	20±2℃	3.0V to 3.3V	3.0V to 3.3V	
	0±2℃	3.0V to 3.3V	2.9V to 3.3V	
Closed-circuit voltage	20±2℃	3.0V to 3.3V	3.0V to 3.3V	Load resistance: 15kΩ, 0.8sec.
	0±2℃	3.0V to 3.3V	2.9V to 3.3V	

(Note)* "Initial" means performance values measured within one month after delivery.

(3) Service life: Service life of batteries when tested in accordance with Subparagraph 4.4(5) shall meet the requirements set forth in Table 2.

[Table 2]

Test item	Temp.	Initial	After 12 months	Remarks
Service life	20±2℃	930 hrs. or longer	890 hrs. or longer	Continuous discharge under 15kΩ load to 2.5V end-voltage.
	0±2℃	865 hrs. or longer	820 hrs. or longer	

(4) Service life after storage at high temperature: Service life of batteries when tested in accordance with Subparagraph 4.4(6) shall meet the requirements set forth in Table 3.

[Table 3]

Test item	Storage temp.	Storage period	Requirement	Remarks
Service life after storage at high temp.	60±2℃	20 Days	890 hrs. minimum	Continuous discharge at 20±2℃ under 15kΩ load to 2.5V end-voltage after storage.

(5) Leakage characteristics: Batteries when tested in accordance with Subparagraph 4.5(1) shall have no leakage.

[Table 4]

Test item	Requirement	Test conditions
Leakage characteristics	No leakage	Temperature: 45±2℃, Relative humidity: (90±5)% Storage: 30days. Shall be inspected by visual means.

(6) Self-discharge: Self-discharge of batteries when tested in accordance with Subparagraph 4.5(2) shall be as set forth in Table 5.

[Table 5]

Test item	Requirement	Test conditions
Self-discharge	2% or below	Continuous discharge under 15kΩ load to 2.5V end-voltage after 12 months storage at 20℃. (to obtain from the mean value of lot)

4. Testing:

4.1 Temperature and humidity: Unless otherwise specified elsewhere, tests shall be conducted at ordinary temperature (20±15℃) and ordinary humidity(65±20)%RH.

4.2 Storage of test specimen batteries: Specimen batteries to be tested after specified storage shall be kept at the ambient temperature of 25℃ or below and at the relative humidity of 65% or below.

4.3 Measuring instruments and devices:

(1) Outer micrometers specified in JIS B 7502, dial gauges specified in JIS B 7503, and vernier callipers specified in JIS B 7507 or those having equal or better accuracy shall be used.

(2) DC voltmeters: The tolerance shall be ±0.005V and the input resistance rating shall be 10MΩ or more.

(3) Load resistance: Load resistance shall include resistance throughout external circuits, and its tolerance shall be ±0.5%.

4.4 Test methods:

(1) Dimensions: Dimension shall be measured with instruments specified in Subparagraph 4.3(1) above, provided that either one or both sides of such instruments shall be insulated in measuring the overall height of batteries.

(2) Appearance: Appearance of batteries shall be inspected by visual means.

(3) Open-circuit voltage: Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 1, and then the voltage between both terminals shall be measured at the same ambient temperature with a voltmeter as specified in Subparagraph 4.3(2).

(4) Closed-circuit voltage: Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 1, and then the voltage between both terminals shall be measured with a voltmeter as specified in Subparagraph 4.3(2) while the specified load is connected between both terminals at the same ambient temperature as specified above; provided that the measured value shall be based on meter readings taken 0.8 seconds after the circuit is closed.

(5) Service life: Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 2, and shall then be continuously discharged at the same ambient temperature and through the specified load resistance. The discharge shall be continued until the terminal voltage of the test specimens falls below the discharge end-point voltage of 2.5V, and the time during which the terminal voltage has been maintained equal to and above the discharge end-point voltage shall be taken as the service life.

(6) Service life after high-temperature storage: Test specimen batteries, after having been stored at the temperature and period specified in Table 3, shall be kept for 12 hours or longer at ordinary temperature(20±15℃) and at ordinary humidity (65±20)%RH and shall then be continuously discharged through the load resistance 15kΩ at ambient temperature of 20±2℃. The discharge shall be continued until the voltage falls below the discharge end-point voltage of 2.5V, and the time during which the voltage has been maintained equal to and above the discharge end-point voltage shall be taken as the service life.

4.5 Other tests: Tests specified below shall be conducted as required. Except as specified in this paragraph, test methods shall be in accordance with the provisions of Paragraph 4.4.

(1) Electrolyte leakage test: Test specimen batteries shall be examined for electrolyte leakage while they are kept at ordinary temperature and at ordinary humidity after having been stored at the temperature, humidity and period specified in Table 4.

(2) Self-discharge: Test specimen batteries which have been stored for 12-month at the ambient temperature of 20±2℃ and at the relative humidity of (65±20)% shall be tested for service life in accordance with the method specified in Subparagraph 4.4(5).

Self-discharge shall be determined in the following manner:

$$\text{Self-discharge rate (\%)} = \frac{X1 - X2}{X1} \times 100$$

X1 : Average initial discharge life of batteries of the same lot

X2 : Average discharge life after storage

5. Markings :

5.1 Markings on batteries:

(1) Battery type: CR2032

(2) Brand of battery: TOSHIBA

(3) Polarity: + (−shall not be indicated)

(4) Manufacturing marks: The year and month of production shall be marked on the ⊖terminal side.

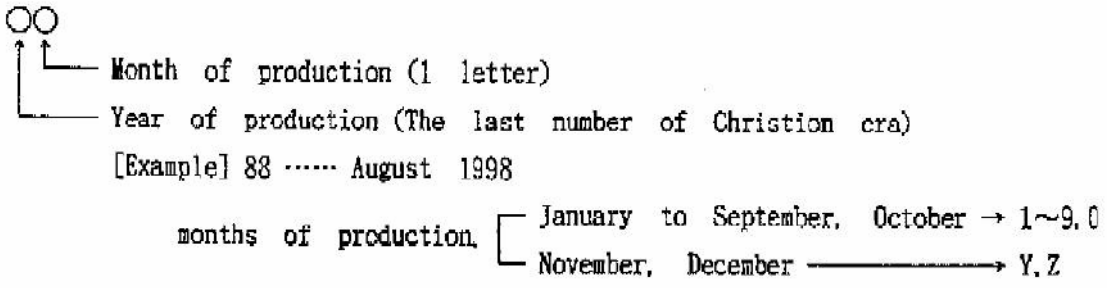
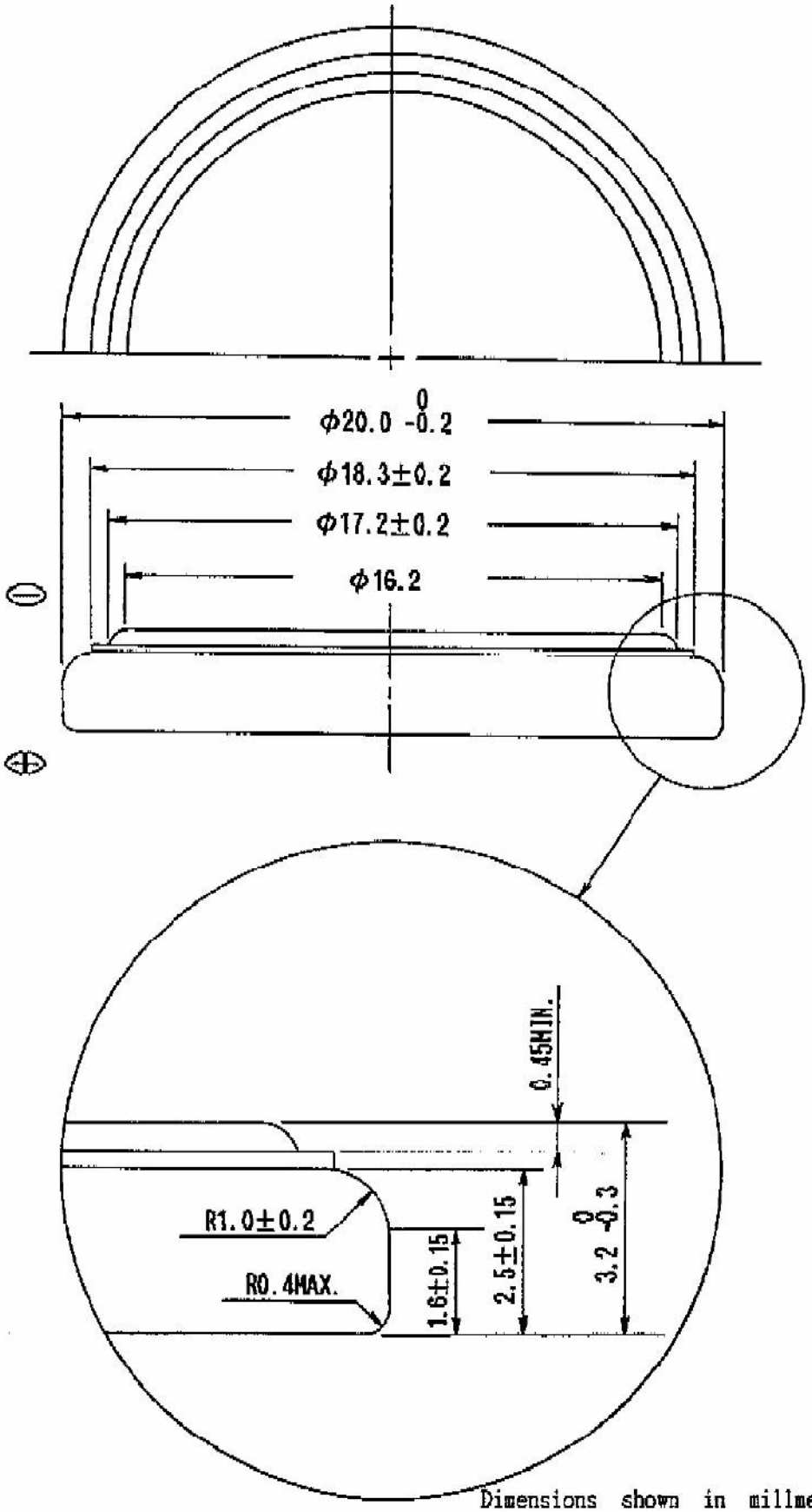

Month of production (1 letter)
Year of production (The last number of Christion era)
[Example] 88 ····· August 1998
months of production
January to September, October → 1~9, O
November, December → Y, Z

Fig. 1

CR2032 BATTERY DIMENSIONS



Dimensions shown in millmeters

Sketch drawn on a scale of 5 to 1